Big Data Driven Architecture for Real Time Systemwide Safety Assurance, Phase II Project

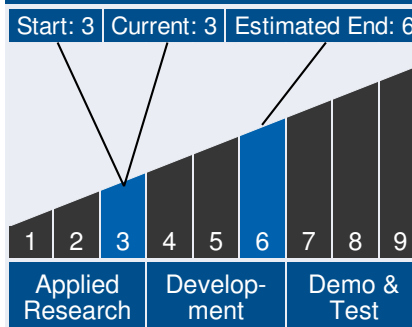SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

Our proposed research work significantly enhances the state-of-the-art in aviation data analytics by providing, for the first time, a one-stop resource for meeting data analysis needs of aviation researchers, analysts and practitioners. The resulting Cloud-based Aviation Big Data Analytics Platform benefits multiple NASA projects: RSSA real-time safety assessment, SMARTNAS test-bed, and the Sherlock ATM data warehouse. Our innovation is researched through achievement of five objectives and associated work efforts. The first objective is the refinement of use cases for the big data application. We draw upon our knowledge gained in Phase I research and continued interactions with aviation stakeholders to narrow the use cases to specific applications that are a challenge to NASA and the broader aviation community related to RSSA, SMARTNAS, and other ATM research efforts. The second objective is to create a Big Data technology-driven architecture and processing capabilities for the more specific use cases developed to meet objective 1. The third objective is to achieve a subcomponent demonstration for each refined use case so that we can measure the benefit of using these techniques to solve ATM analytics challenges. The fourth objective is to tie together the demonstration components developed as part of objective 3, into an overall architecture offering a �one-stop-shop� for both �at-rest� and �in-motion� analytics to meet a variety of research needs. Finally, our fifth objective is to pursue commercialization via outreach to government and industry stakeholders. Most current aviation research focuses on smaller datasets or specific data-types. A massive amount of data thus sits un-analyzed and potentially holds a rich set of undiscovered trends that may be valuable for aviation safety-assurance and NAS efficiency-enhancement. Our SBIR will greatly contribute to the advancement of aviation research by enabling truly big data analytics on this massive, un-tapped data.

Table of Contents

Technology Maturity

Start: 3 | Current: 3 | Estimated End: 6

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

Management Team

Program Executives:
- Joseph Grant
- Laguduva Kubendran

Program Manager:
- Carlos Torrez

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: Enable safety prognostics capability for RSSA to address safety risk/hazard identification techniques on large quantities of historical and streaming live NAS data, Enhance the capabilities of SMART-NAS for researchers to quickly examine system-wide safety implications of new concepts and technologies, Assist ATM researchers directly by enhancing the capabilities of Sherlock with these techniques, and provide a one-stop resource for aviation data acquisition, storage and processing for NASA researchers.

To the commercial space industry:

Potential Non-NASA Commercial Applications: Enable FAA safety personnel to have performance dashboards containing near real-time safety analytics and prognostics Allow airlines to monitor and predict their fleet and pilot safety performance using vast amounts of FOQA and/or other airlines data. Applicable to other international Air Navigation Service Providers for data-driven real time safety assurance.

Management Team *(cont.)*

Principal Investigator:
- John Schade

Technology Areas

Primary Technology Area:
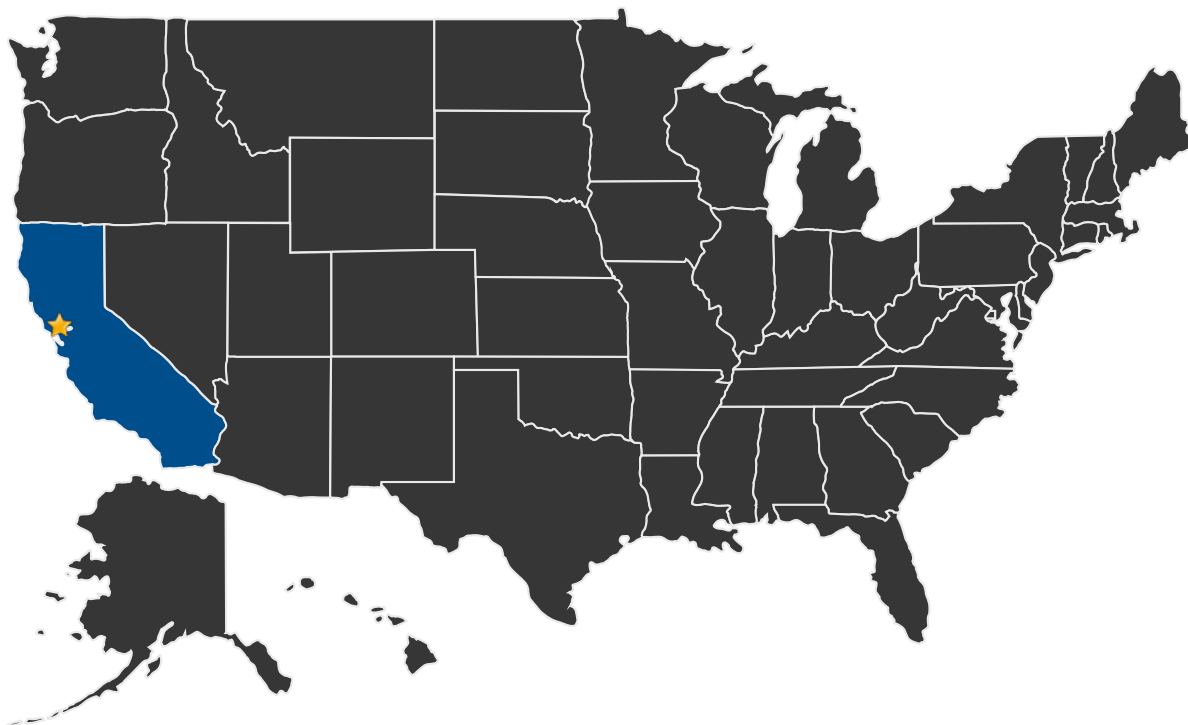Modeling, Simulation, Information Technology and Processing (TA 11)

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U.S. WORK LOCATIONS AND KEY PARTNERS

■ U.S. States With Work ⭐ **Lead Center:**
Ames Research Center

Other Organizations Performing Work:

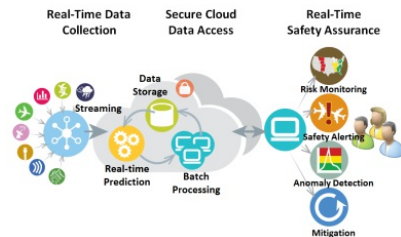- ATAC (Santa Clara, CA)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/23274)

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IMAGE GALLERY

Big Data Driven Architecture for Real Time Systemwide Safety Assurance Phase II, Phase II

DETAILS FOR TECHNOLOGY 1

Technology Title

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Potential Applications

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